Q1. Draw a flow chart and write its corresponding C program to convert an octal number to its equivalent decimal number

ANS

**Octal Number System:**

The octal number is the base-8 number system, and uses the digits 0 to 7. Octal numerals can be made from binary numerals by grouping consecutive binary digits into groups of three (starting from the right).

**Decimal Number System:**

The decimal number has ten as its base, which, in decimal, is written 10, as is the base in every positional numeral system. It is the numerical base most widely used by modern civilizations.

Below are the steps to convert octal to decimal -

Step 1: Take the given octal number.

Step 2: Find out the number of digits in the number

Step 3: Let it have n digits.

Step 4: Multiply each digit in the number with 8n-1, when the digit is in the nth position.

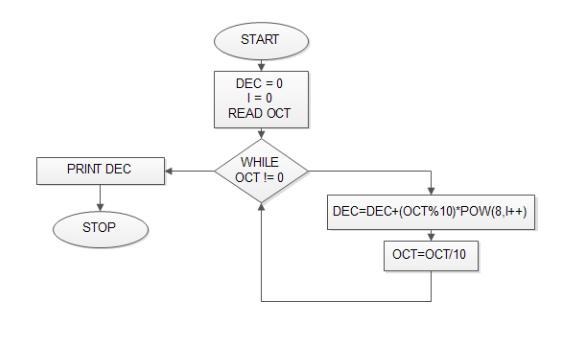
Step 5: Add all digits after multiplication.

Step 6: The resultant is the equivalent decimal to the given octal number.

If octal number contains a decimal point

Step 7: Let m digits are there after the decimal

Step 8: Multiply each digit after decimal with1/8^m ,when the digit is the mth position.



#include <stdio.h>

#include <conio.h>

int power(int base, int exponent)

{

int i=0,ans=1;

if(exponent == 0)

{

return 1;

}

while(i < exponent)

{

ans \*= base;

i++;

}

return ans;

}

void main()

{

int octal, decimal = 0;

int i = 0,ans;

clrscr();

printf("Enter any octal number: ");

scanf("%d", &octal);

ans = power(2,3);

while (octal != 0)

{

decimal += ((octal % 10) \* power(8, i));

octal = octal / 10;

i++;

}

printf("Equivalent decimal value: %d",decimal);

getch();

}

OUTPUT

Enter any OCTAL number 5746

Equivalent decimal value:3046

Q2. Write an algorithm and its corresponding C program to illustrate an ATM money withdrawal operation from user’s savings’ account.

Note: Assumptions can be made wherever necessary.

This C Program performs ATM transaction.

The types of ATM transaction are

1) Check Balance

2) Withdraw Cash

3) Deposit Cash.

You can opt any of the above transaction according to your need of transaction.

ALGORITHM TO ILLUSTRATE AN ATM MONEY WITHDRAWL OPEARTION FROM

USER’S SAVING ACCOUNT.

1. Start balance at 0

2.loop the main menu after every transaction until user presses exit

3. Add will add to the balance

4 Withdraw will deduct from the balance.

5. Check balance will return balance.

6.after every transaction user returns to the main menu.

#include <stdio.h>

double balance = 0.00;

void Deposit(double amount)

{

balance += amount;

}

void Withdraw(double amount)

{

balance -= amount;

}

double CheckBalance()

{

return balance;

}

void main()

{

int choice,flag;

double deposit,withdraw;

clrscr();

do

{

printf("\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

printf("1. Check Balance\n");

printf("2. Withdraw Cash\n");

printf("3. Deposit Cash\n");

printf("4. Quit\n");

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\n\n");

printf("Enter your choice: ");

scanf("%d", &choice);

switch (choice)

{

case 1:

printf("\n YOUR BALANCE IS Rs : %.2lf ",CheckBalance());

break;

case 2:

printf("\n ENTER THE AMOUNT TO WITHDRAW: ");

scanf("%lf", &withdraw);

if (withdraw <= 0)

{

printf("\n PLEASE ENTER POSITIVE AMOUNT");

}

else if (withdraw > CheckBalance())

{

printf("\n INSUFFICENT BALANCE");

}

else

{

Withdraw(withdraw);

printf("\n\n PLEASE COLLECT CASH");

printf("\n YOUR CURRENT BALANCE IS %.2lf", CheckBalance());

}

break;

case 3:

printf("\n ENTER THE AMOUNT TO DEPOSIT");

scanf("%lf", &deposit);

if(deposit <= 0)

{

printf("Please enter a positive number");

}

else

{

Deposit(deposit);

}

printf("YOUR BALANCE IS %.2lf", CheckBalance());

break;

case 4:

printf("\n THANK YOU FOR USING ATM");

break;

default:

printf("\n INVALID CHOICE");

}

printf("\n\n\n DO U WISH TO HAVE ANOTHER TRANSCATION?(\n1:YES \n 0:NO):\n");

scanf("%d", &flag);

} while (flag == 1);

printf("\n\n THANKS FOR USING ATM SERVICE");

getch();

}

OUTPUT:

\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Check Balance

2. Withdraw Cash

3. Deposit Cash

4. Quit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*

Enter your choice: 1

YOUR BALANCE IN Rs : 0.00

DO U WISH TO HAVE ANOTHER TRANSCATION?(

1:YES

0:NO

):

\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Check Balance

2. Withdraw Cash

3. Deposit Cash

4. Quit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*

Enter your choice: 3

ENTER THE AMOUNT TO DEPOSIT5000

YOUR BALANCE IS 5000

DO U WISH TO HAVE ANOTHER TRANSCATION?(

1:YES

0:NO

):

\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Check Balance

2. Withdraw Cash

3. Deposit Cash

4. Quit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*

Enter your choice: 2

ENTER THE AMOUNT TO WITHDRAW: 200

PLEASE COLLECT CASH

YOUR CURRENT BALANCE IS 4800

DO U WISH TO HAVE ANOTHER TRANSCATION?(

1:YES

0:NO

):

\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Check Balance

2. Withdraw Cash

3. Deposit Cash

4. Quit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*

Enter your choice: 2

ENTER THE AMOUNT TO WITHDRAW: 20000

INSUFFICIENT BALANCE

DO U WISH TO HAVE ANOTHER TRANSCATION?(

1:YES

0:NO

):

\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Check Balance

2. Withdraw Cash

3. Deposit Cash

4. Quit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*

Enter your choice: 1

YOUR BALANCE IN Rs : 4800

DO U WISH TO HAVE ANOTHER TRANSCATION?(

1:YES

0:NO

):

\*\*\*\*\*\*\*\*Welcome to ATM Service\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Check Balance

2. Withdraw Cash

3. Deposit Cash

4. Quit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?\*

Enter your choice: 4

THANK U USING ATM

DO U WISH TO HAVE ANOTHER TRANSCATION?(

1:YES

0:NO

):

0

THANKS FOR USING ATM SERVICE.

Q3. Write a program to find the largest element in an array using Recursion.

Step 1 Write function to get max of 2 numbers.

Step 2 Write recursive function

Step3 if only 1 element in array then first element is the largest.

Step 4 if size greater than 1 then find max between number and number – 1 position.

Step 5 call same function while checking the max in step 4 in recursion.

#include<stdio.h>

#include<conio.h>

int max(int num1,int num2)

{

if(num1 > num2)

{

return num1;

}

else

{

return num2;

}

}

int largestNum(int size, int\* a)

{

if(size == 1)

{

return a[0];

}

else

{

return max(largestNum(size - 1,a),a[size - 1]);

}

}

void main()

{

int i,size,a[50];

clrscr();

printf("Enter Size of Array");

scanf("%d",&size);

printf("Enter %d numbers",size);

for(i=0;i<size;i++)

{

scanf("%d",&a[i]);

}

printf("The largest number is %d",largestNum(size,a));

getch();

}

OUTPUT

Enter size of array: 5

Enter 5 numbers

34

56

43

35

21

The largest number is 56.

Q4. Write a C program to separate even and odd numbers of an array and put them in two separate arrays.

Ans

Step 1 get list of numbers in input

Step 2 loop over numbers.

Step 3 if number mod 2 == 0 then put in even list else put in odd list.

Step 4 print both lists.

#include<stdio.h>

#include<conio.h>

void main()

{

int i,size,a[50],even[50],odd[50],evencnt=0,oddcnt=0;

clrscr();

printf("Enter Size of Array");

scanf("%d",&size);

printf("\nEnter %d numbers",size);

for(i=0;i<size;i++)

{

scanf("%d",&a[i]);

if((a[i] % 2) == 0)

{

even[evencnt] = a[i];

evencnt++;

}

else

{

odd[oddcnt] = a[i];

oddcnt++;

}

}

printf("Even numbers are");

for(i=0;i<evencnt;i++)

{

printf("\n %d",even[i]);

}

printf("\nOdd numbers are");

for(i=0;i<oddcnt;i++)

{

printf("\n %d",odd[i]);

}

getch();

}

OUTPUT

Enter Size of Array 5

34

56

41

31

27

Even numbers are

34

56

Odd Numbers are

41

31

27

Q5. Write a C program to determine a given matrix is a sparse matrix.

Sparse matrix is when more than half of numbers in the matrix are 0.

Step 1 Get the size of matrix in input.

Step 2 get values of matrix in input.

Step 3 while getting values check if value is 0.

Step 4. For all zero values increase counter by 1.

Step 5. If count of zeroes is more than half of all values then matrix is a sparse matrix.

#include <stdio.h>

void main ()

{

static int array[10][10];

int i, j, m, n;

int counter = 0;

clrscr();

printf("Enter the order of the matix \n");

scanf("%d %d", &m, &n);

printf("Enter the co-efficients of the matix \n");

for (i = 0; i < m; ++i)

{

for (j = 0; j < n; ++j)

{

scanf("%d", &array[i][j]);

if (array[i][j] == 0)

{

++counter;

}

}

}

if (counter > ((m \* n) / 2))

{

printf("The given matrix is sparse matrix \n");

}

else

printf("The given matrix is not a sparse matrix \n");

printf("There are %d number of zeros", counter);

getch();

}

OUTPUT

Enter the order of Matrix

2

2

Enter the co-efficients of the matix

0

0

0

4

The given matrix is sparse matrix

There are 3 number of zeros.

Q6. Write an interactive C program to calculate the sum of array elements using pointer

#include<stdio.h>

#include<conio.h>

void main() {

int numArray[10];

int i,size, sum = 0;

int \*ptr;

clrscr();

printf("\nEnter size of array : ");

scanf("%d",&size);

printf("\nEnter %d elements",size);

for (i = 0; i < size; i++)

{

scanf("%d", &numArray[i]);

}

//address of first element

ptr = numArray;

//fetch the value from the location pointer by pointer variable.

for (i = 0; i < size; i++)

{

sum = sum + \*ptr;

ptr++;

}

printf("The sum of array elements : %d", sum);

getch();

}

OUTPUT:

Enter Size of Array 5

Enter 5 elements

12

34

98

120

19

The sum of array elements: 283

Q7. Write an interactive C program to append the contents of a file at the end of another file without using any built-in functions.

#include<stdio.h>

#include<conio.h>

void main()

{

FILE \*fp,\*ft;

char \*p,ch;

fp=fopen("first.txt","r");

if(fp == NULL)

{

printf("\n file read error");

exit(0);

}

rewind(fp);

ft = fopen("second.txt","a+");

while(1)

{

ch = fgetc(fp);

if(ch == EOF)

{

break;

}

fputc(ch,ft);

}

fclose(ft);

fclose(fp);

getch();

}

Q8. Write an interactive C program to create a file containing student’s records and also give a provision to update/modify the records too.

#include<stdio.h>

#include<conio.h>

struct Student

{

char name[50];

int studentId;

};

void dummy()

{

float f,\*fp;

fp=&f;

}

int xstrcmp(char \*target,char \*source)

{

int flag = 0;

while(\*target || \*source)

{

flag = \*target - \*source;

if(flag != 0)

{

return flag;

}

target++;

source++;

}

return flag;

}

void CreateRecord()

{

struct Student student;

FILE \*fp;

fp=fopen("student.txt","ab+");

if(fp==NULL)

{

printf("\n file creation error");

exit(0);

}

printf("\n Enter Id, name of student");

scanf("%d%s",&student.studentId,student.name);

fwrite(&student,sizeof(student),1,fp);

fclose(fp);

}

void UpdateRecord()

{

struct Student student;

char name[50];

int records=0;

FILE \*fp = fopen("student.txt","rb+");

printf("Enter student name to update");

scanf("%s",name);

while(fread(&student,sizeof(student),1,fp)==1)

{

if(xstrcmp(name,student.name)==0)

{

printf("\nEnter new name: ");

scanf("%s",student.name);

printf("\nEnter new Student Id.: ");

scanf("%d",&student.studentId);

fseek(fp,sizeof(struct Student)\*records,SEEK\_SET);//This is key line..

fwrite(&student,sizeof(student),1,fp);

}

records++;

}

fclose(fp);

}

void DisplayRecord()

{

FILE \*fp;

struct Student student;

fp=fopen("student.txt","rb");

if(fp==NULL)

{

printf("\n File does not exist");

exit(0);

}

printf("Student Detail are:");

while(fread(&student,sizeof(student),1,fp) != 0)

{

printf("\n Student Id : %d \n Student Name: %s",student.studentId,student.name);

}

fclose(fp);

}

void main()

{

int i,choice;

struct Student student[30],x;

clrscr();

do

{

printf("Enter choice \n1:Create Record \n 2:Update Record\n 3:Display Record \n 4:Exit");

scanf("%d",&choice);

switch(choice)

{

case 1:

CreateRecord();

break;

case 2:

UpdateRecord();

break;

case 3:

DisplayRecord();

break;

case 4:

exit(0);

default:

printf("\n Enter Valid Choice");

}

}

while (choice != 4);

getch();

}

OUTPUT:

Enter choice

1:Create Record

2:Update Record

3:Display Record

4:Exit

1

Enter Id, name of student

1

Sachin

Enter choice

1:Create Record

2:Update Record

3:Display Record

4:Exit

3

Student Details are:

Student Id : 1

Student Name Sachin

Enter choice

1:Create Record

2:Update Record

3:Display Record

4:Exit

2

Enter student name to update

Sachin

Enter new name:

Sachin123

Enter new Student Id

2

Enter choice

1:Create Record

2:Update Record

3:Display Record

4:Exit

3

Student Details are:

Student Id : 2

Student Name sachin123

Enter choice

1:Create Record

2:Update Record

3:Display Record

4:Exit

4